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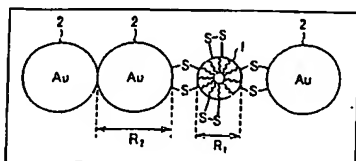
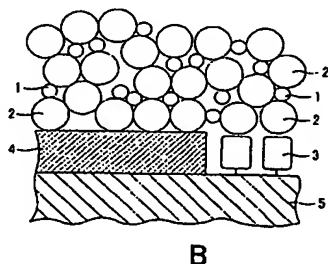
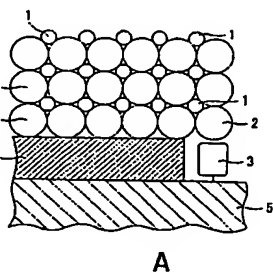
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(54) Title: PHOTOELECTRIC CONVERSION ELEMENT, PROCESS FOR PRODUCING THE SAME, LIGHT SENSOR AND SOLAR CELL

(54) 発明の名称: 光電変換素子及びその製造方法、並びに光センサ及び太陽電池



(57) Abstract: A photoelectric conversion element for use in light sensors and solar cells. In particular, a photoelectric conversion element comprising a photoelectric conversion layer composed of an assembly of light-absorbing dendrimer structures (1) acting as an electron donor and metal fine particles (2) acting as an electron acceptor wherein the two components (1) and (2) have chemical affinity to each other so as to form the layer in a self-assembly fashion. In this photoelectric conversion element, the light-absorbing substance consists of dendrimer structures, so that electrons having been excited by light absorption undergo long-distance electron transfer via molecular chains and can reach the metal fine particles (2) acting as an electron acceptor. The electrons are quickly led outside as electric current through contact between metal fine particles and/or between metal fine particles and electrode.

(57) 要約: 本発明は、光センサや太陽電池に用いられる光電変換素子であり、電子供与体として働く光吸収性の dendrimer 構造体 (1) と、電子受容体として働く金属微粒子 (2) との集合体からなる光電変換層を両者に化学的親和性をもたせることで、自己集合的に形成させる。この光電変換素子は、光吸収性の物質が dendrimer 構造を有するため、光吸収によって励起された電子が分子鎖を介して長距離の電子移動を起こし、電子受容体として働く金属微粒子 (2) にまで到達できる。電子は、金属微粒子同士又は/及び前記金属微粒子と電極との接触を通じて、すみやかに外部へ電流として導き出される。



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GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI 特許 (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

添付公開書類:

— 国際調査報告書

— 請求の範囲の補正の期限前の公開であり、補正書受領の際には再公開される。

2 文字コード及び他の略語については、定期発行される各 PCT ガゼットの巻頭に掲載されている「コードと略語のガイダンスノート」を参照。

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/11741

## A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl<sup>7</sup> H01L31/08, H01L31/042, H01M14/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl<sup>7</sup> H01L31/04-31/09, H01M14/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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Kokai Jitsuyo Shinan Koho	1971-2003	Jitsuyo Shinan Toroku Koho	1996-2003

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	T. Tasaki et al., CSJ: The Chemical Society of Japan Koen Yokoshu, Vol.81, No.1, page 389, (20020311), "Preparation and photoelectrochemical properties of electrodes modified with alternately assembled porphyrin derivative-gold nano particles"	1-34
X	M. Lahav et al., J.Am.Chem.Soc., 1999, 121, pages 258 to 259, "Assembly of a Zn(II)-Porphyrin-Bipyridinium Dyad and Au-Nanoparticles Superstructures on Conductive Surfaces"	1-34
P,X	S. Yamada et al., Thin Solid Films 438-439 (2003) 70-74, "Gold nanoparticle-porphyrin self-assembled multistructures for photoelectric conversion"	1-34

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search  
15 December, 2003 (15.12.03)Date of mailing of the international search report  
13 January, 2004 (13.01.04)Name and mailing address of the ISA/  
Japanese Patent Office

Authorized officer

Facsimile No.

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International application No.

PCT/JP03/11741

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2002-237611 A (Hitachi Maxell, Ltd.), 23 August, 2002 (23.08.02), Full text; all drawings (Family: none)	1-34
A	JP 2001-320068 A (Fuji Photo Film Co., Ltd.), 16 November, 2001 (16.11.01), Full text; all drawings (Family: none)	1-34
A	JP 11-40871 A (Mitsubishi Chemical Corp.), 12 February, 1999 (12.02.99), Full text; all drawings (Family: none)	1-34
A	JP 2000-336171 A (Mitsubishi Chemical Corp.), 05 December, 2000 (05.12.00), Full text; all drawings (Family: none)	1-34
A	N. Krasteva et al., Nano Letters, Vol.2, No.5, (2002), 551-555, "Self-Assembled Gold Nanoparticle/Dendrimer Composite Films for Vapor Sensing Applications"	1-34